

WHAT IS CLAIMED IS:

1. A signal conversion device for use in a process control system, comprising:

a first pair of electrical connections configured to couple to a two-wire process control current loop which includes a two-wire process variable transmitter;

a second pair of electrical connections configured to couple to a voltage input channel of a process device; and

an electrical component electrically connected to a first electrical connection of the first pair of electrical connections and a first electrical connection of the second pair of electrical connections for digital communication with the two-wire process variable transmitter.

2. The apparatus of claim 1 wherein the electrical component is in series between the electrical connections.

2. The apparatus of claim 1 wherein the electrical component comprises a resistor.

3. The apparatus of claim 2 wherein the resistor has a resistance of between about 230 and about 600 ohms.

4. The apparatus of claim 1 including a voltage drop component connected between the second pair of electrical connections configured to provide a

voltage drop in response to a current through the two-wire process control current loop.

5. The apparatus of claim 4 wherein the voltage drop component comprises a resistor.

6. The apparatus of claim 1 including a switch connected in parallel with the electrical component.

7. The apparatus of claim 5 wherein the resistance of the voltage drop component is 5 ohms.

8. The apparatus of claim 1 wherein a current through the two-wire process control current loop ranges between about 4 mA and 20 mA.

9. The apparatus of claim 1 wherein a voltage between the second pair of electrical connections ranges between about 20 mVolts and about 100 mVolts.

10. The apparatus of claim 1 including a power supply.

11. The apparatus of claim 10 wherein the power supply provide a DC output of between about 10 V and about 50 V and is coupled in series with the two-wire process control current loop.

12. The apparatus of claim 1 including a output indicative of an active power supply on the two-wire process control current loop.
13. The apparatus of claim 12 wherein the output comprises an optical output.
14. The apparatus of claim 1 wherein the process device includes multiple input channels.
15. The apparatus of claim 1 wherein the first pair of electrical connections is configured for HART® communication.
16. A signal conversion device for use in a process control system, comprising:
 - a first pair of electrical connections configured to couple to a two-wire process control current loop which includes a two-wire process variable transmitter;
 - a second pair of electrical connections configured to couple to a voltage input channel of a process device; and
 - digital communication coupling means for coupling a digital communication signal to the two-wire process control current loop through the first pair of electrical connections.

17. The apparatus of claim 16 wherein the digital communication coupling means comprises a resistor.
18. A method for use in a process control system, comprising:
 - providing a process control current loop for coupling to a two-wire process variable transmitter;
 - providing a first pair of electrical connections on the two-wire process control current loop for coupling to a digital communicator; and
 - providing a second pair of electrical connections for coupling to a voltage input channel of a process device.
19. The method of claim 18 including providing an impedance between the first pair of electrical connections.
20. The method of claim 18 including providing an impedance between the second pair of electrical connections.
21. The method of claim 18 wherein the voltage drop across the second pair of electrical connections is between about 20 mVolts and about 100 mVolts.
22. The method of claim 18 wherein a two-wire process control current loop carries an electrical current between about 4 mA and 20 mA.

23. The method of claim 18 including digitally communicating with the two-wire process variable transmitter.
24. The method of claim 23 wherein the digital communicator comprises communicating in accordance with the HART® Standard.